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Telephone Engineering Newsletter

Newsletters are intended to provide a means of answering questions that arise frequently in the field and to advise the field of new developments. They are not intended to be instructions nor to replace in any respect the presently approved channels for establishing requirements and procedures.

TE & CM Sections Now Being Printed

Rev. 205 Preparation of an ACD
Add. 406 Attenuation Data
Add. 422 Subscriber Loop Transmission Calculations
New 463 REA-1 Transposition System
New 910 Subscriber Carrier Systems Engineering

Dial Mobile Radio in Florida

The Automatic Electric Company developed mobile radio telephone equipment for REA which was installed for trial by the North Florida Telephone Company last July in their Brandford exchange area. The equipment provides service equivalent to that given by the Motorola installation at Amherst, Va., described in Newsletter No. 16, August 1957. The chief differences in the two are that the Automatic fixed and mobile radio units use standard rotating dials whereas Motorola uses push buttons for dialing; and that the Automatic equipment uses conventional type relays whereas Motorola uses electronic circuits. Radio telephones are installed in two service automobiles of the telephone company, one having 25 watts output and the other 50 watts. A fixed 25 watt station is located in the home of the central office maintainer 25 miles from the base station. These units are for maintenance and operational use by the telephone company. This type of service will be offered to the public on a rental basis when more equipment is available. The Automatic and Motorola equipments both provide for 10 party full selective signaling and revertive call service. Also both are capable of serving 20 or more stations on the same radio channel. The Brandford base station antenna is on an existing 140 foot microwave tower. The range for mobile units is 25 to 40 miles from Brandford depending on the direction. This installation will be demonstrated to interested parties and the press December 12 and 13.

Doubling the Tension in Line Wire

REA Form 511, Telephone System Construction Contract, specifies that "each line conductor shall be tensioned to approximately twice normal stringing tension and then reduced to final stringing tension". This is to ensure that coil bends and some inelastic stretch be removed from the wire. Some contractors have considered this to be a difficult requirement, necessitating an expensive dynamometer to measure the tension and consequently have asked higher prices for wire stringing if this requirement is insisted upon. The practical method for meeting this requirement is to pull the conductor during the stringing operation to at least one-half the stringing sag before letting off to the stringing sag. In the stringing operation it makes little difference in the future performance of the conductor how far above stringing sag the conductor is pulled up as long as it is not stressed beyond 80 to 85 percent of the ultimate strength. This gives a lot of leeway in which to meet the above requirement. Since sag and tension vary inversely in any given span, the sag is a convenient means of gaging the tension where an approximation of half of the stringing tension is required. The operation is too simple to merit extra charge for meeting the requirement.

Color Coded Cables

REA is working on specifications for color coded polyethylene insulated, polyethylene jacketed cables.

It will be some time before these specifications will be in effect. Some of the more important design changes under consideration are as follows. Each pair in a cable is to be distinguished from every other pair by colors of insulations. The colors used for ring conductors will be blue, orange, green, brown and slate, repeated five times. Each group of five will have a different colored mate or tip conductor, the colors being white, red, black, yellow and purple. Cables over 25 pairs will be even multiples of 25 pairs. This eliminates the former odd pair cable sizes such as the 26, 51, 76, 101 pair sizes. All 25 pair units will have the same colors for the individual pairs. The individual 25 pair units in the cables having multiples of 25 pairs will be identified by different colored binder threads. The metallic shield will be placed longitudinally instead of the helical shield used heretofore. This type of shield will give lower d-c resistance and better shielding from noise than given by the helical shield.

Increased Tension Effect on Horizontal Pull at Angle Poles

Sag and tension data for certain gauges and kinds of line wire at increased tensions designed to minimize mid-span hits are given in REA-TE & CM-616 and Addenda thereto. The question has arisen as to the effect of the increased tensions on the horizontal pulls at angle poles, which information is needed in guying problems. The answer is that the increase in

corner pulls is too small due to increased tension to merit issuance of figures other than given in the wire makers data sheets for normal tensions. The reason for the slight difference is that the effect of ice is much greater than the wire tension and is the same regardless of the stringing tensions. Therefore, the horizontal pull data for angle poles given in the wire makers data sheets for normal stringing tensions should be used in guying problems where the higher stringing tensions are used.

Buried Wire and Cable Construction in Missouri

A demonstration of construction practices in burying wire and cable took place in October in the plant of the Northeast Missouri Rural Telephone Company (Mo. 538-B). Observers present included REA staff and field personnel, representatives of several wire and cable manufacturers and other telephone companies. The work was performed under contract using methods and materials determined upon sometime prior to the demonstration. About 50 miles of fully color coded plastic insulated, plastic sheath cable varying in size from 6 pair to 101 pair were buried on the project; also 135 miles of 1 pair wire; 35 miles of two 1 pair wires and 11.5 miles of drop wire. The cable was manufactured according to tentative REA specifications. Cable splices were all made above ground on pedestals or poles. The cable was plowed in to an average depth of 24 inches and the 1 pair wire at a depth of about 18 inches. Buried drop wires were buried at a 12 inch depth. Hand trenching was kept to a minimum. The project showed the need for a better pedestal for terminals for which development is underway. The work demonstrated the ease with which buried plant can be placed where soil conditions permit.

Central Office Contact Cleaning Fluid

Considerable use has been made in the past of carbon tetrachloride for cleaning relay contacts in telephone central office equipment, despite the toxic effects of the chemical and the fact that a slight residue was deposited on the contacts. A new solvent called chlorothene recently placed on the market by the Dow Chemical Company overcomes the above objections and is considered satisfactory for use in cleaning relay contacts in telephone central offices.

Driven Ground Electrodes for Fuseless Station Protectors

Through an oversight REA Form 511, Telephone System Construction Contract, Rev. 2-57, permits the use of P1-6F fuseless station protector units which provide only a single driven rod as a ground electrode. REA does not recommend that fuseless station protectors be grounded this way since the proper functioning of fuseless station protectors depends to a large extent on a low impedance ground connection. It is expected that the P1-6F will be removed from Form 511 when the next revision is made; during the intervening period its use should be avoided. Use of the P1-1F through P1-5F fuseless protector unit is satisfactory and is preferred where permitted by Section 805 of the TE & CM.

Trial of Minnesota Mining and Manufacturing Company (3M) Shear Type Sealing Connector for Joining Wires in Cable Splices

The Breezewood Telephone Company, Breezewood, Pennsylvania (Pa. 512), began use of the 3M new shear type sealing connectors in splicing the cable conductors in September 1957 on a job involving 31 miles of plastic insulated, plastic sheathed cable at their Warfordsburg exchange. A demonstration of the use of the new connectors was made for representatives of REA, other telephone companies and certain military agencies in October 1957. The cable conductors spliced were 22 to 22 A.W.G. in straight splices and 22, 22 and 24 A.W.G. (3 wires) at terminals. The complete project involved over 6,000 of the new connectors. The connectors join two or three wires of any of a wide range of gauges. They require no removal of insulation from the conductors. This is removed by shearing action, the conductors being connected mechanically, insulated and sealed as a unit. Both hand and compressed gas operated compression tools were used in applying the connectors. The results evidenced by the number of defective joints in percentage of total joints and in conductivity of completed joints are favorable at present but the effect of moisture that may gain access to the splices remains to be determined by future tests over a considerable period of time.